

sequence, said mixing occurring in the presence of at least one nucleic acid/nucleic acid denaturing reagent permitting the formation of a PNA probe/nucleic acid complex when said selected target sequence is present;

- c) separating said PNA probe/nucleic acid complex from other components of the mixture resulting from step b); and
- d) detecting said PNA probe/nucleic acid complex.

45. (Amended) A method for detecting a plurality of selected target sequences in polynucleotides, said method comprising the steps of:

- a) providing a sample comprising at least one single stranded nucleic acid sequence and its complementary strand capable of forming double stranded sections of greater than 50 nucleotide subunits, wherein said at least one single stranded nucleic acid sequence and its complementary strand is suspected to include a plurality of selected target sequences;
- b) mixing said sample with a plurality of PNA probes each having a sequence complementary to at least a portion of a respective one of said selected target sequences of said at least one single stranded nucleic acid sequence and its complementary strand, said mixing occurring under conditions permitting the formation of at least one PNA probe/nucleic acid complex when said respective one of said selected target sequences is present;
- c) separating said at least one PNA probe/nucleic acid complex from other components of the mixture from step b); and
- d) detecting said at least one PNA probe/nucleic acid complex.

46. (Amended) An apparatus comprising:

*7/23*

- a) a sample introduction zone;
- b) at least one PNA probe labeled with a detectable moiety, said PNA probe disposed to mix upstream of a separation zone with a sample introduced in said introduction zone, said sample comprising at least one double stranded polynucleotide, said at least one PNA probe having a sequence complementary to a selected nucleotide target sequence suspected to be present in said at least one double stranded polynucleotide;
- c) a nucleic acid/nucleic acid denaturing reagent permitting the formation of a PNA probe/nucleic acid complex when said selected target sequence is present; and
- d) said separation zone in communication with said introduction zone, said separation zone separating said PNA probe/nucleic acid complexes from other components present in said introduction zone and said separation zone.

58. (Amended) A microchip apparatus comprising a plurality of capillary channels, each said capillary channel further comprising:

- a) a sample introduction zone;
- b) at least one PNA probe labeled with a detectable moiety, said PNA probe disposed to mix upstream of a separation zone with a sample introduced in each said introduction zone, said sample comprising at least one double stranded polynucleotide, said at least one PNA probe having a sequence complementary to a selected target sequence suspected to be present in said at least one double stranded polynucleotide;
- c) a nucleic acid/nucleic acid denaturing reagent permitting the formation of a PNA probe/nucleic acid complex when said selected target sequence is present;
- d) a detection zone; and